

2/1/18

"Challenges are what make life interesting and overcoming them is what makes life meaningful."  
-Joshua J. Marine

HW: "Polynomial Practice HW"  
Test 1 on Thursday 2/15

AIM: Practice with Polynomials?

Warm Up:

Complete #1 and #2 on the handout

1. If  $f(3) = 0$ , then  $(x-3)$  is a factor of  $f(x)$ .

2. If  $x+2$  is a factor of  $f(x)$ , then  $-2$  is a zero of  $f(x)$ .

Set factors = 0 we can find the zeros  
solutions  
roots  
answers

3. If  $f(x) = (x-2)(x+1)(3x-1)$ , then the zeros of  $f(x)$  are: 2, -1,  $\frac{1}{3}$

$$x-2=0$$

$$x=2$$

$$x+1=0$$

$$x=-1$$

$$3x-1=0$$

$$\begin{array}{r} +1 \quad +1 \\ \hline 3x-1=0 \\ +1 \quad +1 \\ \hline 3x=1 \end{array}$$

$$\frac{3x}{3} = \frac{1}{3}$$

$$x = \frac{1}{3}$$

4. If  $f(5) = 0$ , then a factor of  $f(x)$  is:  $(x-5)$

$$x=5$$

$$(x-5)$$

5. If  $2x-3$  is a factor of  $f(x)$ , then  $f(\underline{\frac{3}{2}}) = 0$

$$2x-3=0$$

$$\begin{array}{r} +3 \quad +3 \\ \hline 2x-3=0 \\ +3 \quad +3 \\ \hline 2x=3 \end{array}$$

$$\frac{2x}{2} = \frac{3}{2}$$

$$x = \frac{3}{2}$$

6. Factors of  $x^3 + x^2 - 4x - 4$  are  $(x-2)$ ,  $(x+2)$  and  $(x+1)$ . What are the zeros of the polynomial?

$$2 \quad -2 \quad -1$$

7. Given the zeros of  $x^3 - 6x^2 + 11x - 6$  are 1, 2, and 3. What are the factors of the polynomial?  
Check by multiplication.

$$(x-1)(x-2)(x-3)$$

$$x^2 - 2x - 1x + 2$$

$$(x^2 - 3x + 2)(x-3)$$

	$x^2$	$-3x$	$+2$	
$3x$	$x^3$	$-3x^2$	$2x$	$x$
$-6x^2$	$-3x^2$	$9x$	$-6$	$-3$
	$11x$	$-6$		

$$x^3 - 6x^2 + 11x - 6$$

8. Show that -3 is a zero of  $f(x) = x^3 + 7x^2 + 7x - 15$ .

zero

$$(-3)^3 + 7(-3)^2 + 7(-3) - 15$$

$$-27 + 63 - 21 - 15$$

$$36 - 36$$

$$0$$

$$\begin{array}{cc} -3^2 & (-3)^2 \\ -9 & 9 \end{array}$$

9. Given that  $(x-1)$  is a factor of  $f(x) = 3x^3 - 4x^2 - 9x + 10$  find all zeros of  $f(x)$ .

$$x=1$$

$$\begin{array}{r|rrrr} 1 & 3 & -4 & -9 & 10 \\ & \downarrow & 3 & -1 & -10 \\ \hline & 3 & -1 & -10 & 0 \end{array}$$

$$3x^2 - 1x - 10$$

$$(x-1)(3x^2 - 1x - 10)$$

$$\begin{array}{l} 3x^2 - 6x \quad +5x - 10 \\ 3x(x-2) \quad 5(x-2) \end{array}$$

$$(x-1)(x-2)(3x+5)$$

$$\begin{array}{l} x=1 \quad x=2 \quad 3x+5=0 \\ \quad \quad \quad -5-5 \\ \quad \quad \quad \hline \quad \quad \quad 3x = -5 \\ \quad \quad \quad \frac{3}{3} \quad \frac{-5}{3} \\ \quad \quad \quad x = -\frac{5}{3} \end{array}$$

$$\left( -\frac{5}{3}, 1, 2 \right)$$

10. One root of  $x^3 + 8x^2 + 11x - 20 = 0$  is  $-5$ . Find the complete solution set of this equation.

all zeros

$$\begin{array}{r|rrrr} -5 & 1 & 8 & 11 & -20 \\ & \downarrow & -5 & -15 & 20 \\ \hline & 1 & 3 & -4 & 0 \end{array}$$

$$(x^2 + 3x - 4)$$

$$(x+4)(x-1)$$

$$x = -4 \quad x = 1 \quad x = -5$$

11. Show that  $(x+1)$  is a factor of  $x^3 - 2x^2 + 3 = 0$ . Use this information to find the solution set of this equation.